

and pressing it between the upper parts of the filaments, cannot fail to pull asunder the anthers, and thus to cause many loose pollen-grains to fall down upon the proboscis, which are deposited on the stigma of the next flower following.* Thus, in both, cross-fertilisation is secured in case humble-bees visit the flowers, whereas butterflies may easily thrust their slender proboscis down to the honey without even touching the anthers, consequently without any benefit to the plant. Suppose, therefore, that *R. crista galli* (*a*) *major* were growing in the Alpine region, and visited frequently by butterflies, but never or only very exceptionally by humble-bees, all or nearly all the individuals would of necessity perish without leaving posterity, unless any modification of the flowers adapted to cross-fertilisation by butterflies appeared. *R. alpinus* may perhaps be considered as having originated in such a way; for the arrangement and mutual situation of all the parts of its flower is just the same as in *R. major*, with only this modification, that the entrance between the margins of the upper lip (*e*, Fig. 57), through which in both forms of *R. crista galli* butterflies as well as humble-bees thrust their proboscis, in *R. alpinus* is completely closed (*pp*, Figs. 54, 55), only a minute opening (*e*, Figs. 51-56) between two lateral flaps being visible at the tip of the beaked prolongation of the upper lip. No other insects except butterflies would be able to insert their proboscis through this narrow entrance into the flower; and butterflies, when doing so, could not fail to thrust their proboscis between the left and right anthers (as explained by the dotted line in Figs. 53 and 56), and to dust it with pollen-grains, which would partly be deposited on the stigma of the young flower next visited; for in young flowers (as shown in Figs. 51 and 53) the style overtops the tip of the beaked prolongation, and the stigma is placed before the minute opening, just in the way of any entering proboscis, whereas in older flowers the stigma is retracted behind the opening by an incurving of the style (as shown in Fig. 56).

HERMANN MÜLLER

THE TRANSIT OF VENUS

THE long-anticipated Transit of Venus took place yesterday morning; and already has the first instalment of news from distant observers arrived. The Astronomer Royal has been good enough to inform us that Col. Tennant's observations at Roorkee, India, have been quite successful; 100 photographs have been taken. He also telegraphs, at the moment of going to press, the gratifying intelligence that the micrometric observations near Cairo and Suez, and the photographic observations at Thebes have entirely succeeded.

At the last meeting of the Astronomical Society the Astronomer Royal gave an account of the final arrangements of the English parties, which do not vary much from those we stated some time ago. Messrs. Green have arranged for one of their outgoing ships to pass near Kerguelen's Land, with a view of picking up intelligence and telegraphing it from Melbourne.

The southern stations occupied by the American, French, and German parties leave no doubt that the Hallycan method will be extensively employed.

The final arrangements of the French parties have been telegraphed to yesterday's *Times* as follows:—

"France has six stations—three in the Northern Hemisphere, at Pekin, Nagasaki, and Saigon; and three in the Southern Hemisphere, at Noumea, Campbell Island, and St. Paul's Island. Three of these, Nagasaki, Cochin China, and Noumea, present comparatively no difficulties as regards the voyage and installation. The Nagasaki Commission is headed by M. Janssen, member of the Institute and the Board of Longitude, who has taken part in several scientific voyages resulting in important discoveries. He is assisted by M. Tisserand, superintendent of the Toulouse Observatory, and M. Picard,

a naval lieutenant, who will employ the photographic apparatus of MM. Fizeau and Cornu, while a professional photographer will use an apparatus invented by M. Janssen. In Cochin China there will be only one observer, M. Héraud, a hydrographic engineer. It was at first decided, as a measure of economy, to dispense with the observations in Cochin China, but it was ultimately resolved to profit by M. Héraud's presence in the colony. He will probably be stationed in Tonquin, of which he is preparing a map. M. André, of the Observatory, and M. Angot, of the College of France, have proceeded to Noumea with an equatorial and photographic lens. The observers at Pekin, St. Paul, and Campbell Islands have had to encounter greater difficulties. It is not very easy to reach Pekin with cumbersome luggage. The Commission has had to reach Tien-tsin by Suez and Shanghai, and thence proceed in junks by the canals. It is headed by M. Fifyriaia, a naval lieutenant celebrated for his astronomical labours, and comprises two other naval officers, MM. Blarez and Lapied. Their return may be toilsome, as the winter will obstruct the transport of their instruments. At St. Paul and Campbell Islands the observers have had to found a temporary colony in uninhabited islands, without any resources. St. Paul, situated nearly in the centre of the line from the Cape to Australia, is the crater of a volcano which is becoming extinct. There are steep cliffs on all sides, but towards the west the cone sinks, and the interior of the crater forms a creek where vessels can penetrate. No pure water is to be found. The encampment has been established as near as possible to the sea, the salt water having to be distilled for drinking purposes. The St. Paul Commission is composed of M. Mouchez, captain and member of the Board of Longitude, the author of works on the coast of Brazil and Algeria; M. Turquet, naval lieutenant, long accustomed to astronomical observations, as his coadjutor; M. Cazin, an eminent Professor at the Lyceum of the Rue du Havre, who is entrusted with the photography; and a navy surgeon, M. Rochefort, who will devote himself to the natural history of the island. The Commission is accompanied by twelve naval officers and sailors. Campbell Island, the most distant station, is about 200 leagues south of New Zealand. It is likewise uninhabited, its climate seems disagreeable, and, unfortunately, the sky, as at St. Paul, is rarely free from clouds. It possesses, however, good water and a good port. The observers are MM. Bouquet and Hatt, both eminent hydrographic engineers; M. Courrejolles, naval lieutenant; and M. Filbol, the delegate of the Museum and the surgeon of the expedition. There are also twelve sailors. Everything necessary for the subsistence of sixteen men during three months has had to be transported to these two last stations, three months being necessary to determine the exact latitude and longitude of the observatories."

ON THE NORTHERN RANGE OF THE FALLOW DEER IN EUROPE

IN the interesting essay by Dr. Jeitteles, translated by Dr. Sclater, in *NATURE*, vol. xi. p. 71, many cases of the reputed discovery of the remains of the Fallow Deer are collected together to prove that the animal is indigenous in Northern Europe, and not imported from the south, as heretofore has been supposed by many able naturalists, such as Blasius, Steenstrup, Rütimeyer, the late Prof. Ed. Lartet, and others. These cases are accepted by Dr. Sclater without criticism, and are deemed by him to place the importation theory, as it may be termed, in the category of "ancient fables." The question, however, seems to me, after many years' study of the fossil and recent Cervidæ of this country and of France, a very difficult one, not to be decided off-hand, and certainly not without a strict

* H. Müller, "Befruchtung der Blumen durch Insecten," p. 294, *et seq.*

analysis of the value of evidence such as that recorded by Dr. Jeitteles, whose method and facts appear to be equally in error.

The identification of fragments of antlers is one of the most difficult tasks which a naturalist can take in hand, and where there are several species of deer associated together in the same deposit, it is sometimes impossible to assign a given fragment to its rightful owner. For example, in the forest beds of Norfolk and Suffolk, and in the Pleistocenes of the Continent, there is a vast number of antlers which are ownerless and which have completely baffled Prof. Gaudry, myself, and others for many years. It is, of course, easy for anyone to classify the flat antler as belonging to one species and the round to another; but the value of the determination depends upon the number of species living at the same time in the same place, possessed respectively of round and flattened antlers. In the Pleistocene and Prehistoric ages, there were four animals which had portions of their antlers flattened—the Reindeer, Irish Elk, True Elk, and Stag—to which, according to Dr. Jeitteles, must be added the Fallow Deer. In this particular case it is not only assumed that the flat antler fragments belong to the last of these animals, but even the uncertain testimony of various authors, who had not critically examined the remains, which they record, in relation to the other species, is taken to prove the range of the Fallow Deer as far north as Denmark. The mere printed reference to the Fallow Deer is accepted as evidence, without, save in two cases, being verified by personal examination. The results of such a method of inquiry seem to me to demand most careful criticism.

The alleged cases of the discovery of Fallow Deer in Central and Northern Europe are as follows. In Switzerland, it is stated to have been identified by Dr. Rüttimeyer among the animals which had been used for food by the dwellers in the Lake villages; "although," he writes, "incontrovertible evidence of the spontaneous existence of this deer north of the Alps remains still to be obtained" (quoted by Dr. Jeitteles in *NATURE*, vol. xi. p. 72.) In a list of the Swiss mammalia which Dr. Rüttimeyer was kind enough to prepare for me in 1873, the animal is altogether omitted from the Pleistocene and Prehistoric Fauna. Thus, in the opinion of this high authority, it was not living in Switzerland in those early days. The animal is stated also (on the authority of Jäger in 1850) to have been found abundantly in "the caverns and turbaries as well as in the diluvial freshwater chalk of Wurtemberg." To this I would oppose the opinion of my friend Prof. Oscar Fraas, of Stuttgart, from whose list of animals (sent to me in 1872) the Fallow Deer is conspicuous by its absence. The Reindeer is abundant in the caves of that region, and to it the flattened fragments of antlers may probably be referred.

To pass over the reputed discovery of the animal "in an old place of sacrifice" near Schlieben, in 1828, in which the discoverer himself remarks that "the subject requires further investigation," there only remain three other sets of fragments to be examined in Germany. First, those at Olmütz, which Dr. Rüttimeyer considered to belong possibly to the Stag; secondly, an indistinct figure in the "Ossements Fossiles," of an antler attached to a skull found at Stuttgart, which seems to me to belong to the Reindeer; and lastly, a fragment of antler from Buchberg, which, taken along with the find at Olmütz, is the second of the two cases identified by Dr. Jeitteles. It is a museum specimen, which may very probably be liable to the same doubts as those which are entertained by Dr. Rüttimeyer regarding the fragments from Olmütz. The teeth and bones quoted from Ham-burgh are as likely to belong to the Stag as to the Fallow Deer.

The alleged instances of the discovery of the animal in this country and in France are equally unsatisfactory.

The flattened antlers alluded to by Buckland and Owen belong either to the Stag or the Reindeer. Among the many thousands of bones and teeth which I have examined from the ossiferous caves of various ages, from refuse-heaps, and tumuli, I have never seen any fragment which could be attributed to Fallow Deer, except in refuse-heaps not older than the Roman occupation. Nor is it found in Ireland till the Middle Ages. The late lamented Prof. Ed. Lartet, whom I always consulted on difficult questions such as these, believed that the animal was not living in Central and Northern France in the Pleistocene or Prehistoric ages, but that it was imported probably by the Romans.

The only evidence against this view is that afforded by an antler dug up in Paris and brought to Prof. Gervais along with stone celts by some workmen. It seemed to me when I saw it in 1873, in the Jardin des Plantes, not altogether conclusive, because of the absence of proof that all the remains were obtained from the same undisturbed stratum. I should expect to find such antlers in the refuse-heaps of Roman Paris, as in Roman London, and I should not be at all surprised if the remains of widely different ages were mingled together by the workmen, even if they were found in the same excavation. As examples of the necessity of guarding against this source of error, I may quote a recent lower jaw of Kangaroo Rat in the collection of my late friend Mr. Wickham Flower, which was stated to have been dug out of the brick-earth near Sittingbourne, along with the mammoth and other Pleistocene creatures; the bones of an ostrich brought to Prof. Busk, along with mammoth and hippopotamus from the gravels of Acton Green; and lastly, the skeleton of Fallow Deer found in a bog not far from the River Boyne above Leinster Bridge (Co. Kildare), along with a skull of Brown Bear (Scott, *Journ. Geol. Soc. Dublin*, vol. x. p. 151). This last case would have been taken as decisive that the animal lived in Ireland in prehistoric times as a contemporary of the Brown Bear, had not a silver collar round its neck proved that it had belonged to "a member of Lord Rosse's family."

From premises so unsatisfactory as those which have been examined, it seems to me very hazardous to conclude with Drs. Jeitteles and Sclater that the Fallow Deer inhabited Northern and Central Europe in the Pleistocene and Prehistoric ages. The point, to say the very least, is non-proven. On the other hand, the non-discovery of certain relics of the animal by the many able naturalists who have examined vast quantities of fossil remains from those regions, implies, to my mind, the probability that the animal was not then in those parts of Europe. The value of negative evidence depends upon the number of observations, which in this case is enormous. To speak personally, I am in the position of a man waiting for satisfactory proof, holding that up to the present time the common Fallow Deer "has never been found to occur in the fossil state in Northern and Central Europe"—a position which I see no reason to change from the arguments brought forward in *NATURE*. The animal *ought* to be found fossil in those regions; and it is not for want of looking that it has not yet been found.

For the sake of clearness, I have reserved the reference to other forms of deer, in the essay, for separate discussion. The *Cervus polignacus* of Pomel, from Auvergne, is an obscure form without definition, about which I will not venture to say anything. The *Cervus somoniensis* of Cuvier, which I have carefully studied in Paris along with Prof. Gervais, is identical with the form which I have described from Clacton, Essex (*Quart. Geol. Journ.*, 1868, p. 514), under the name of *Cervus brownii*. The latter has been identified by Prof. Busk among the fossil remains from Acton Green. The typical antler of Cuvier's species differs from Plate XVII. Fig. 4 of *C. brownii*, in the possession of a palm of four points, and in being broken and badly restored with plaster at the point where

the third tye, *d*, of my figure joins the beam. Whether this kind of antler belongs to a well-marked variety of Fallow Deer or to a closely-allied species, I will not offer an opinion. It seems, however, safer to follow Professors Lartet, Gaudry, and most of the naturalists since the days of Cuvier, in keeping the fossil separate from the living forms, none of which present, so far as I know, a similar variation of antler. Till such an antler be found it is better to keep the animals apart in classification. And even if they be viewed as belonging to one species, they have only been met with in Pleistocene deposits in this country and in France, and they may reasonably be taken as visitors from the south, such as the contemporary hippopotami. In any case I would submit that they do not afford satisfactory grounds for believing with Dr. Sclater that the present distribution of the Fallow Deer in Northern and Central Europe by the hand of man is "an ancient fable." It is undoubtedly an ancient belief, and it is one which can be proved to some extent to be true by an appeal to the records of history.

To enter into the question of the introduction of Fallow Deer into Northern Europe would far outleap the limits of an article. A reference to Lenz's "Zoologie der Alten," and to Neckam's "Natural History," will show to what an extent the wealthy Romans and mediæval barons were in the habit of importing wild and rare animals for the chase, as well as for the sake of mere curiosity.

W. BOYD DAWKINS

THE ENGLISH ARCTIC EXPEDITION

SINCE our note of last week, the preparations for the Arctic Expedition have been advanced an important stage by the selection of Capt. Nares, of H.M.S. *Challenger*, to command the expedition. The choice is a happy one. Capt. Nares distinguished himself on board the *Resolute* in the Arctic Expedition of 1852-54, serving with McClinton, Meham, and Vesey Hamilton. He led the depot sledge for Meham's more extended journey. On that occasion he went over 665 miles in sixty-five days, while his efficient assistance enabled Meham to cover 1,006 miles of ground in ninety-four days. Nares was also foremost in providing amusement for the men during the winter quarters, one of the most essential qualifications for Arctic work. His recent experience in the *Challenger* will have made him thoroughly acquainted with the duties required of the commander of a scientific expedition. Commander A. H. Markham, of H.M.S. *Sultan*, will also take a prominent position in the expedition. Capt. Nares was at Hong Kong when he received the telegram offering the command, and probably by this time is on his way home. The command of the *Challenger* will, it is understood, be entrusted to Capt. Frank T. Thomson, now in command of H.M.S. *Modeste*, in China, and who was the first captain selected for official duties in the Royal Naval College at Greenwich.

We announced, a fortnight ago, that the Admiralty had selected Rear-Admiral Richards, C.B., F.R.S., Rear-Admiral Sir Leopold McClinton, F.R.S., and Rear-Admiral Sherard Osborn, C.B., F.R.S., to advise them as to the preparations that should be made. This Committee met for the first time on Tuesday week, and have been sitting periodically since.

We understand that the Foreign Office is about to inquire of the United States Government whether the stores sent to a depot on the west coast of Greenland for the use of the *Polaris* are desired to remain there, or whether they may be made available for our expedition. If the United States consent to transfer these stores, it will be of considerable advantage to our ships.

Active preparations are being made at the Royal Victoria Victualling Yard at Deptford, for provisioning

the ships which are to be engaged in the expedition. For this purpose 15,000 lb. of beef are undergoing a process of preservation.

It has been proposed, and no doubt very properly, that no persons not actually belonging to the navy can be allowed to take part in the expedition. This, however, effectually precludes any naturalist—as such—being attached to the staff. But the work to be done will principally consist in making collections to be worked up at home. And there is no reason to doubt that, as in the expedition of the *Erebus* and *Terror*, men will be found officially qualified for attachment to the expedition who will use every opportunity of securing for British science the credit of determining the nature of the fauna and flora of the regions in immediate proximity to the pole.

How great an interest is felt amongst naturalists as to the biological results of the expedition, may easily be imagined on reading the following passage from Markham's "Threshold of the Unknown Region" (pp. 201, 202):—

"The winter quarters were in a harbour called 'Thank God' Bay, in lat. 81° 38' N., and long. 61° 44' N., which the *Polaris* reached on Sept. 3. . . . The climate of the winter quarters was found to be much milder than it is several degrees further south. In June the plain surrounding 'Thank God' Bay was free from snow; a creeping herbage covered the ground, on which numerous herds of musk oxen found pasture, and rabbits and lemmings abounded. The wild flowers were brilliant, and large flocks of birds came northward in the summer."

The Kew Herbarium possesses four plants presented to it by Commander Markham, who obtained them from Dr. Bessels, of the *Polaris*. They were collected in 82° N. lat., "the most northern position from which any phanerogamic vegetation has hitherto been procured. The locality appears to have been on the east side of Smith's Sound. The species are *Draba alpina*, L.; *Cerastium alpinum*, L.; *Taraxacum Denis-leonis*, Desf. var.; and *Poa flexuosa*, Wahl." (NATURE, vol. viii. p. 487.)

The importance of obtaining information about the marine forms of life, both animal and vegetable, needs no insisting upon.

NOTES

It will interest our readers to hear that the Berlin Academy of Sciences has set aside a certain sum of money, which will enable it to call to Berlin eminent men of science, who will have no teaching duties to perform. Prof. Kirchhoff has finally decided to accept the directorship of the Observatory for Solar Physics, now being erected at Potsdam, and will proceed to Berlin to commence his duties in connection with its establishment, in the spring.

It is with great regret that we have to record the death of one of our most promising young naturalists, Mr. J. Traherne Moggridge, whose occasional contributions to these columns gave evidence of the powers of observation and research for which he was distinguished. His works on "Harvesting Ants and Trap-door Spiders," and "Contributions to the Flora of Mentone"—the latter beautifully illustrated by his own hand—contained important additions to our knowledge of different branches of science; a "Supplement" to the former of these works is just now issued from the press. Mr. Moggridge's kindly and unassuming manners had endeared him to a large circle of friends. A love of natural history was with him hereditary, being the grandson of Dillwyn, the monographer of the Conferva, and joint author with Turner of the "Botanist's Guide." He died on Nov. 24, at the age of thirty-two, at Mentone, where the state of his health had compelled him to spend the winter for several years past. One of his great wishes